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Company and Below Command and Control Information Exchange Study

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14. ABSTRACT

This report presents the results of a recently conducted task analysis on the communications needs for the Marine Corps Distributed Operations (DO) concept of infantry operations and recommendations based on currently available technologies for outfitting future DO small units. The results of this task analysis should be of use not only to DO but also to other rapidly paced collective/team-oriented operations that would benefit from distributed command and control decision structures. The intent of DO is to take advantage of advanced, distributed information technologies and systems in order to enable these teams to function more autonomously than they have in the past. Communication systems typically employed by the Marine Corps infantry do not offer practical support for this mode of operation. A summary of the advantages and disadvantages of the sensory "channels" available for communicating timely information is provided. In addition, a description of the desired traits for an effective communications package suitable for modes of team operation such as DO is offered.

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COMPANY AND BELOW COMMAND AND CONTROL INFORMATION EXCHANGE STUDY

INTRODUCTION

The primary purpose of this document is to provide the Marine Corps Warfighting Laboratory (MCWL) Technology Division with a human-factors based assessment of the optimal mix of communications modalities and devices at each node from the Company and below while working in a Distributed Operations (DO) mode.

This final report includes updated versions of previous deliverables under this study including the information exchange list per node, the DO communications task analysis, the list of modes per exchange type, and the recommended system/optimal mix of devices per mode. The numbering system employed in the Task Analysis section of this report reflects the numbering in the task analysis provided to MCWL as part of the phase 1 deliverable under this study.

In putting this report together, we were also aware that it may end up in the hands of other individuals or organizations seeking to support technological developments or other improvements to the DO concept. With this possibility in mind, we have made an effort to provide a sufficient level of information for those less familiar with the terminology of the Marine Corps to comprehend and interpret its contents.

Overview

The DO concept is an exploration into the expansion of the capabilities and responsibilities of the rifle platoon and squad [1]. The motivation for exploring DO is to enable the squad and platoon to respond to both symmetric and asymmetric threats more rapidly and decisively. In DO, squads and platoons will exercise greater autonomy by taking initiative based on the commander's intent and on their current understanding of the operational situation. In DO, a high level of expertise is required (and will arise from greater levels of training) [2]. DO will permit small units to operate at greater distances from each other and from higher command elements. A DO prepared unit must also be equipped with the appropriate technologies to operate in this mode. In this regard, the primary technical limitation preventing traditionally deployed Marine units from adopting the DO mode is the range of their communications gear and the increase in communications burden that DO places on the small unit leaders. The goal of this study has been to identify the optimal set of communication modalities and gear for DO equipped units.

The contents of the information exchange list and task analysis detail the common or significant communications likely to occur within an infantry company. The specific chains of communication detailed in this list are based upon our understanding of the likely concept of operations (CONOPS) for a company, or elements of a company operating in a DO mode. This understanding has been acquired through discussions and exchanges with members of MCWL who are themselves directly responsible for the experimentation and development of the DO concept. In addition, a Marine Corps subject matter expert resident within the Warfighter Human-Systems Integration Laboratory (WHSIL) was used extensively during the knowledge elicitation phase of the task analysis.

Manuscript approved April 30, 2007.

The information exchange list is organized by communication node. It begins with communications between Fire Team Leader and Squad Leader and moves up the chain of command to the level of Company Commander. The numbering of this list refers the reader to specific critical tasks detailed in the task analysis. The task analysis itself is organized by critical functions, with the primary function areas being Intelligence, Maneuver, Fire Support, Command and Control, and Logistics. For those not familiar with Marine Corps acronyms, Table 1 provides a glossary of acronym definitions used in this document.

Table 1 — Acronyms Used in this Document

Arty	Artillery
BDA	Battle Damage Assessment
BN	Battalion
CAS	Close Air Support
CASEVAC	Casualty Evacuation
CFF	Call for Fire
Co CO	Company Commander
COC	Command Operations Center
CSS	Combat Supporting Supply
FAC	Forward Air Controller
FDC	Fire Direction Center
FSCC	Fire Support Coordination Center
FT LDR	Fire Team Leader
IED	Improvised Explosive Device
MCWL	Marine Corps Warfighting Laboratory
MTO	Message to Observer
NSFS	Naval Surface Fire Support
OPORD	Operation Order
PLT CDR	Platoon Commander
POW	Prisoners of War
S-2	Intelligence Shop
SACC	Strategic Afloat Command Center
SALUTE	Size of enemy force, Activities of the enemy, Location of enemy, Unit identification, Time, and Equipment
SEAD	Suppression of Enemy Air Defense
SITREP	Situation Report
SMEAC	Situation (enemy and friendly forces), Mission, Execution (Commander's intent, concept of operation, etc.), Administrative/Logistics, Command/Signal
SQD LDR	Squad Leader

The third section (List of Modes per Exchange Type) presents our findings of the primary modes of communication identified as useful for DO. These rely heavily on verbal/auditory and visual communications modes. In many cases it proved useful to distinguish between text and graphical forms of visual communication as well. With limited exceptions, verbal/auditory communication remains the best choice for lower echelons (squad leader and below), where Marines need to spend much of their time

attending to their surrounding environment and their hands should remain free to operate their weapons. At the level of the squad leader and above, visual communications become more practical. This is particularly true for the transmission of spatial information, detailed and structured communications (9-line entries, for example), or where the urgency of communications is low. Thus the optimal modality for communicating becomes much more task and situation dependent at these echelons.

New technologies offer the opportunity for mixed-modality messaging and for digitizing verbal messages. Under some circumstances, these new approaches appear to offer potential advantages and should be explored further. The haptic communication modality, for example, provides an interesting alternative to auditory-based communications and alerts in some instances. However, this mode of communication has not been well tested. Some recent experiments suggest that haptic cues may be frequently missed by individuals who are marching with heavy loads. Voice over internet protocol (VOIP) provides another example of a potentially useful communications advancement. VOIP would carry the standard advantages of traditional voice communications, but could bring added advantages of time stamping, queuing of incoming messages, and storing a record of verbal communications to be used for after action reviews and generation of lessons learned reports. These possibilities are addressed in the summary table in the third section, but are not separately considered in the prioritized list of modes in this section.

The fourth section provides our recommendations for the optimal mix of modalities per node and the recommended system of devices per node. The selection of devices is based upon the current understanding of communications gear available for DO operatives as indicated to us by MCWL. As new options become available, review of the information provided in the third section of this report should provide insight into its likely benefit for DO warfighters.

INFORMATION EXCHANGE LIST PER NODE

The Information Exchange List per Node and the Task Analysis were originally developed for MCWL as a means to elicit formal and detailed feedback on our understanding of the communications needs for the company level echelon and below working in a DO mode. They are provided here with the assumption that they would provide a better understanding of our recommendations for other readers, but also with the expectation that they would serve as a useful reference and starting place for others seeking to perform task analyses for DO.

The information exchange list is organized by communication node. It begins with communications between Fire Team Leader and Squad Leader and moves up the chain of command to the level of Company Commander. The numbering of this list refers the reader to specific critical tasks detailed in the Task Analysis (where the descriptions of these exchanges can be found). This list simply provides a comprehensive itemization of the specific types of communications that an individual operating at that node would need to carry out in the course of their duties.

Fire Team – Squad Exchanges

- Fire Team to Squad Leader
    - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
    - 1.5 Urgent Unformatted Reports
    - 1.6 Routine Unformatted Reports
    - 3.2 Position Report at Designated Area/Check Point
- Squad Leader to Fire Team
    - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
    - 1.5 Urgent Unformatted Reports
    - 1.6 Routine Unformatted Reports
    - 2.2 Distribute Intelligence
    - 3.1 Issue Frag Order

    - 10.1 Issue Warning Order

Squad – Platoon Exchanges

- Squad Leader to Platoon Commander
    - 1.2.1 Provide a Situation Report (SITREP)
    - 1.2.2 Report Enemy Activity (SALUTE)
    - 1.5 Urgent Unformatted Reports
    - 1.6 Routine Unformatted Reports
    - 2.4 Request For Information (RFI)
    - 3.2 Position Report at Designated Area/Check Point
    - 6.1 Request Fires on a Target
    - 7.6 Squad JTAC Reports Battle Damage Assessment (BDA).
    - 13.1.1 Request Resupply (e.g., ammo, food, medical)
    - 13.2.1 Casualty Report (CASREP)
- Platoon Commander to Squad Leader
    - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
    - 1.5 Urgent Unformatted Reports
    - 1.6 Routine Unformatted Reports
    - 2.2 Distribute Intelligence
    - 3.1 Issue Frag Order
    - 8.4 Response to Request for Fires on a Target
    - 10.1 Issue Warning Order
- Platoon Commander to 60-mm Mortar
    - 5.1.1 Call for Fire (60-mm Mortar)
- 60-mm Mortar to Squad JTAC
    - 5.1.2 Message to Observer (MTO)
    - 5.1.3 Report Shot and Splash
- Squad JTAC to 60-mm Mortar
    - 5.1.3 Report Shot and Splash
    - 5.1.4 Adjust Fire
    - 5.1.5 Inform Fire Asset of Mortars Effect

Squad – Battalion Exchanges

- Squad JTAC to 81-mm Mortar Firing Asset
    - 5.2.3 Report Shot Fired
    - 5.2.4 Adjust Fire
    - 5.2.5 Inform Fire Asset of Mortar's Effect
- 81-mm Mortar Firing Asset to Squad JTAC
    - 5.2.2 Message to Observer
    - 5.2.3 Report Shot Fired
- Squad JTAC to Artillery Battery
    - 6.4 Report Shot and Splash
    - 6.5 Adjust Fire
    - 6.6 Inform FDC of Artillery's Effect
- Artillery Battery to Squad JTAC
    - 6.3 Message to Observer
    - 6.4 Report Shot and Splash
- Squad JTAC to Ship (NSFS)
    - 8.3 Report Shot and Splash
    - 8.4 Adjust Fire
    - 8.5 Report on Rounds Effect
- Ship (NSFS) to Squad JTAC
    - 8.2 Message to Observer
    - 8.3 Report Shot and Splash

- Squad JTAC to Air Asset
    - 7.4 Air Asset and Squad JTAC coordinate attack (9 Line)
    - 7.5 Air Asset Enters Target Area and Confirms Target
    - 7.6 Squad JTAC Reports Battle Damage Assessment (BDA)
- Air Asset to Squad JTAC
    - 7.4 Air Asset and Squad Leader coordinate attack (9 Line)
    - 7.5 Air Asset Enters Target Area and Confirms Target
    - 7.6 Squad JTAC Reports Battle Damage Assessment (BDA)
- Squad Leader to Battalion
    - 13.2.2 Request Casualty Evacuation (CASEVAC) from Battalion
- Battalion to Squad
    - 13.2.3 Battalion Responds to CASEVAC Request and Provides Contact Information
- Transportation Asset to Squad
    - 13.2.4 Transportation Asset Responds to CASEVAC

Platoon – Company Exchanges

- Platoon Commander to Company Commander
    - 1.2.1 Provide a Situation Report (SITREP)
    - 1.2.2 Report Enemy Activity (SALUTE)
    - 1.5 Urgent unformatted reports
    - 1.6 Routine unformatted reports
    - 3.2 Position Report at Designated Area/Check Point
    - 2.4 Request for Information
    - 13.2.1 Casualty Report (CASREP)
- Company Commander to Platoon Commander
    - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
    - 1.5 Urgent unformatted reports
    - 1.6 Routine unformatted reports
    - 2.2 Distribute Requested Intelligence
    - 3.1 Issue Frag Order
    - 10.1 Issue Warning Order
- Platoon Commander to 60-mm Mortar Firing Asset
    - 5.1.1 Call for Fire (60-mm Mortar)

Platoon – Battalion Exchanges

- Platoon Commander to 81-mm Mortar Firing Asset
    - 5.2.1 Call for Fire
    - 5.2.4 Adjust Fire
    - 5..2.5 Inform FDC of Artillery's Effect
- 81-mm Mortar Firing Asset to Platoon Commander
    - 5.2.2 Message to Observer
    - 5.2.3 Report Shot Fired
- Platoon Commander to Artillery Battery
    - 6.2 Call for Fire (Artillery)
    - 6.5 Adjust Fire
    - 6.6 Inform FDC of Artillery's Effect
- Artillery Battery to Platoon Commander
    - 6.3 Message to Observer
    - 6.4 Report Splash and Shot
- Platoon Commander to Ship (NSFS)
    - 8.1 Call for Fire (Naval Gunfire)
    - 8.3 Splash and Shot (Naval Gunfire)
    - 8.4 Adjust Fire
    - 8.5 Report on Rounds Effect

- Ship (NSFS) to Platoon Commander
    - 8.2 Message to Observer
    - 8.3 Splash and Shot (Naval Gunfire)
- Platoon Commander to BN FSCC
    - 7.2 Request Air Asset from Fire Support Coordination Center
- Platoon Commander and Air Asset (Bilateral Comm)
    - 7.4 Air Asset and Squad Leader coordinate attack (9 Line)
    - 7.5 Air Asset Enters Target Area and Confirms Target
    - 7.6 Squad leader reports battle damage assessment (BDA) of target back to Air Asset
- Platoon Commander to Battalion
    - 13.2.2 Request Casualty Evacuation (CASEVAC) from Battalion
- Battalion to Platoon Commander
    - 13.2.3 Battalion Responds to CASEVAC Request and Provides Contact Information
- Transportation Asset to Platoon Commander
    - 13.2.4 Transportation Asset Responds to CASEVAC
- ** Platoon Commander to BN S-2
    - 2.5 Request Intelligence from BN S-2
- ** BN S-2 to Platoon Commander
    - 2.6 Battalion S-2 Provides Platoon Commander Intelligence
- Platoon Commander to CSS
    - 13.1.2 Request Supplies from Combat Supporting Supply (CSS)

Company – Battalion Exchanges

- Company to Battalion
    - 1.2.1 Provide a Situation Report (SITREP)
    - 1.2.2 Report Enemy Activity (SALUTE)
    - 1.5 Urgent unformatted reports
    - 1.6 Routine unformatted reports
    - 2.4 Request for Information
    - 3.2 Position Report at Designated Area/Check Point
    - 13.3.2 Request Casualty Evacuation (CASEVAC) from Battalion
    - 13.3.1 Casualty Report (CASREP)
- Battalion to Company
    - 1.2.1 Provide a Situation Report (SITREP)
    - 1.5 Urgent unformatted reports
    - 1.6 Routine unformatted reports
    - 3.1 Issue Frag Order
    - 11.1 Battalion Issues OPORD
    - 13.3.3 Battalion Responds to CASEVAC Request and Provides Contact Information
- Company to BN S2
    - 2.5 Request Intelligence from BN S2
- Company to Combat Service Support
    - 13.1.2 Request Supplies from CSS unit
- Company FST Arty Rep Artillery FDC
    - 6.2 Call for Fire
    - 6.5 Adjust Fire
    - 6.6 Inform FDC of Artillery's Effect
- Artillery FDC to Company FST Arty Rep
    - 6.3 Message to Observer
    - 6.4 Report Splash and Shot
- Company FST NGL to Ship (NSFS)
    - 8.1 Call for Fire (Naval Gunfire)
    - 8.3 Splash and Shot (Naval Gunfire)

  - 8.4 Adjust Fire
  - 8.5 Report on Rounds Effect
- Ship (NSFS) to Company FST NGL
  - 8.2 Message to Observer
  - 8.3 Splash and Shot (Naval Gunfire)
- Company FST Air Rep to BN FSCC
  - 7.2 Request Air Asset from Fire Support Coordination Center
- Company FST Air Rep to Air Asset (Bilateral Comm).
  - 7.4 Air Asset and Observer Coordinate Attack (9 Line)
  - 7.5 Air Asset Enters Target Area and Confirms Target
  - 7.6 Observer Reports Battle Damage Assessment (BDA)
- Transportation Asset to Company
  - 13.2.4 Transportation Asset Responds to CASEVAC

**** This exchange would only occur when a single platoon was ashore. Otherwise, it would occur at a higher level of command.**

TASK ANALYSIS: COMPANY CRITICAL TASKS

The task analysis presented in this report is focused entirely on DO tasks occurring at the Company echelon and below that require communications. This includes communications between these elements and Battalion level assets as well, if the other communicating element was at the Company level or below. The task analysis is organized at the top level by Functional Activity (Intelligence, Maneuver, Fire Support, Command and Control, and Logistics). Under each Functional Activity, are the Capabilities requiring communications, and defined under each Capability are the specific tasks requiring communications.

The process of assembling this task analysis was an iterative one conducted with extensive input from the members of the Marine Corps Warfighting Laboratory responsible for the initial development and field evaluations of the DO concept. We received draft CONOPS (concept of operations) scenarios, list of communications gear planned for deployment with early DO equipped units, lists of other communications gear currently available, and a host of other documents detailing various aspects of the DO concept. We then assembled a "straw man" version of the list of communications tasks with the aid of a subject matter expert (SME) resident in our lab (a USMC reserve infantry officer). This list was reviewed by the MCWL SMEs, revised based on their input, and then resubmitted for further revisions and prioritization of tasks. The result of several iterations of this process is presented here.

Each task presented in this task analysis has a goal and description provided. If the task itself is associated with an identified communications event, that event is described in a table listing who sends the information, who receives the information, who needs to monitor the communication, on which network the information is relayed, what kind of information is relayed, what the purpose of the communications is, and what the potential problems or limitations may be. If the communications events are strictly associated with subtasks under these tasks, then this information is provided at the subtask level.

Intelligence:
1) Collect Information
2) Disseminate Intelligence

Maneuver:
3) Conduct Tactical Movement
4) Engage Enemy with Direct Fire and Maneuver

Fire Support:
5) Employ Mortars

6) Employ Close Air Support
7) Employ Field Artillery
8) Employ Naval Gunfire
9) Coordinate, Synchronize, and Integrate Fire Support

Command and Control:

10) Plan for Combat Operations
11) Direct and Lead Unit during Preparation for the Battle
12) Direct and Lead Units in Execution of Battle

Logistics:

13) Handle Combat Support Issues (e.g., casualties, supply, POWs)

1. Collect Information

Goal: Obtain information relative to the enemy, terrain, and weather and send it up the chain of command.

Description: This process involves collecting battlefield information, evaluating the information, and selecting the appropriate action. Information may be immediately reported up the chain, gathered and later sent up the chain with other information, or stopped at its current level if it is not appropriate for higher levels of command. The Squad Leader, Platoon CDR, and Company CO act as filters for the flow of information.

Communication: Contained within subtasks.

1.1 Evaluate Information

Goal: Determine the relative importance of the information

Description: The Marine evaluates the content of the information to determine who it may impact, whether it is actionable and whether it needs to continue up the chain of command.

Communication: May occur in later tasks

Notes: Proceed to either task 1.2, 1.3, or 1.4

1.2 Report Information up the Chain of Command

1.2.1 Provide a Situation Report (SITREP)

Goal: Pass important information through the chain of command.

Description: Report information up the chain of command and horizontally when it is either critical, or an opportunity has presented itself to provide a larger report of less critical items.

Communication:

	Bi-directional		Monitor:	Network:
Potential Exchanges:	FT LDR	SQD LDR	Other FT LDRs	Squad Net
	SQD LDR	PLT CDR	Other SQD LDRs	Platoon Net
	PLT CDR	Co CO	Other PLT CDRs	Company Net
Information	Anything unusual such as trash that has not been picked up, potential IEDs. The formality of the exchange will depend on proximity, urgency, and experience. The exchange is more likely to be formal at higher levels of command as more information is filtered out.			
Purpose:	Provide battlefield information to higher level of command and others at the same level of command.			
Potential Problems:	Range limitations.			

Notes: Tasks 1.1 and 1.2 will loop as information makes its way to the Co CO. Exchanges between the fire team leader and squad leader are unformatted.

1.2.2 Report Enemy Activity (SALUTE)

Goal: Report Enemy Sighting and Movement up the chain of command.

Description: Report information up the chain of command and horizontally regarding enemy sightings and movement. Information reported contains the enemy size, activities, location, unit identification, time, and equipment.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	SQD LDR	PLT CDR	Other SQD LDRs	Platoon Net
	PLT CDR	Co CO	Other PLT CDRs	Company Net
Information	The formality of the exchange will depend on proximity, urgency, and experience. The exchange is more likely to be formal at higher levels of command as more information is filtered out. A SALUTE Report contains Size of enemy force, Activities of the enemy, Location of enemy, Unit identification, Time, and Equipment carried by enemy.			
Purpose:	Provide intelligence on enemy movement to higher level of command and others at the same level of command.			
Potential Problems:	Range limitations.			

1.3 Hold Information for Later Report

Goal: Add received information to a report to be sent up the chain at an appropriate time.

Notes: Once sufficient information has been collected and the time is appropriate then information will be reported (return to task 1.2**)**.

1.4 Stop Information at Current Level of Command

Communication: None

Notes: This occurs when there is no action.

1.5 Urgent Unformatted Reports

Goal: Provide information on current situation which requires immediate action.

Description: This is a generic communication for transmitting urgent information. It can be passed either up or down the chain.

Communication:

	Bi-Lateral		Monitor:	Network:
Potential Exchanges:	Battalion	Co CO	Other PLT CDRs	Battalion Net
	Co CO	PLT CDR	Other PLT CDRs	Company Net
	PLT CDR	SQD LDR	Other SQD LDRs	Platoon Net
	SQD LDR	FT LDR	Other FT LDRs	Squad Net
Information	This is a generic communication type and is used when urgent information needs to be reported immediately up or down the chain of command. An example is a request for support.			
Purpose:	Provide actionable information to designated units.			
Potential Problems:	Range limitations.			

1.6 Routine Unformatted Reports

Goal: Provide regular information on current situation which may not require immediate action.

Description: This is a generic communication for transmitting regular information. It can be passed either up or down the chain.

Communication:

	Bi-Lateral		Monitor:	Network:
Potential Exchanges:	Battalion	Co CO	Other PLT CDRs	Battalion Net
	Co CO	PLT CDR	Other PLT CDRs	Company Net
	PLT CDR	SQD LDR	Other SQD LDRs	Platoon Net
	SQD LDR	FT LDR	Other FT LDRs	Squad Net
Information	This is a generic communication type and is used when regular information needs to be reported up or down the chain of command			
Purpose:	Provide information to designated units.			
Potential Problems:	Range limitations.			

2. Disseminate Intelligence

Goal: Provide timely intelligence to lower levels of command.

Communication: Contained within subtasks

2.1 Evaluate Intelligence

Goal: Determine if intelligence is relevant to lower levels of command or across the current level of command.
Communication: May occur in later tasks
Notes: Proceed to either task 2.2, 2.3, or 2.4.

2.2 Distribute Intelligence

Goal: Pass relevant intelligence down the chain of command

Description: Report relevant battlefield intelligence down the chain of command. This will allow the lower levels of command to maintain a battlefield Situation Awareness. Actionable intelligence will be sent down the chain immediately.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	Co CO PLT CDR SQD LDR	PLT CDR SQD LDR FT LDR	Other PLT CDRs Other SQD LDRs Other FT LDRs	Company Net Platoon Net Squad Net
Information	There is no official format for intelligence passed down the chain of command.			
Purpose:	Provide a “heads up” to lower levels of command.			
Potential Problems:	Range limitations.			

2.3 Hold Intelligence for Later Report

Goal: Hold less critical information for a later report so the commanding officer is not disrupted.

Notes: No communication

2.4 Request for Information (RFI)

Goal: Squad Leader informs the Platoon Commander of an intelligence need.

Description: Squad leaders will request intelligence from the Platoon Commander.

Communication:

	Sender:	Receiver:	Monitor:	Network:
	SQD LDR	PLT CDR	Other SQD LDRs	Platoon Net
Information	Squad Leader informs the Platoon Commander of what information they need.			
Purpose:	Indicate a need for intelligence to the Platoon Commander.			
Potential Problems:	Range limitations.			

Notes: Proceed to task 2.5. Initial work at MCWL suggested that the ability to contact the BN S-2 should come no lower than a Platoon CDR.

2.5 Request Intelligence from Battalion S-2

Goal: The Platoon Commander or above requests specific intelligence from the Battalion S-2.

Description: The Platoon Commander goes to the battalion S-2 to request an intelligence update. The Platoon Commander would usually only go directly to Battalion if they were the only platoon ashore.

Communication:

	Sender:	Receiver:	Monitor:	Network:
	PLT CDR	BN S-2	Co CO (in the BN COC)	Battalion Net
Information	The Platoon Commander or Company CO requests specific information from the BN S-2. The platoon commander would typically go direct to the BN S-2 if they were the only platoon ashore. Otherwise he would contact the Company Commander.			
Purpose:	Solicit information from the BN-S2.			
Potential Problems:	None assuming a single Platoon ashore with the Company CO monitoring communications in the Battalion Command Operations Center (COC). Leaving the Company network would not present any problems since the Company Commander will still be able to monitor the Platoon's communications.			

Notes: In a single Platoon ashore scenario, the Company Commander would be collocated in the Battalion COC.

2.6 Battalion S-2 Provides Platoon Commander Intelligence

Goal: Provide the Platoon Commander with requested intelligence.

Communication:

	Sender:	Receiver:	Monitor:	Network:
	BN S-2	PLT CDR	Co CO	Battalion Net
Information	BN S-2 provides the PLT CDR with the requested information.			
Purpose:	BN-S2 provides information down the chain			
Potential Problems:	No identified problems			

2.7 Platoon Commander Provides Squad Leader Requested Intelligence

Goal: Provide the Squad Leader with the intelligence they requested.

Notes: This is the same as Task 2.2.

3. Conduct Tactical Movement

Goal: Secure or retain positional advantage using terrain and formations.

Description: Move direct fire weapons to gain a positional advantage relative to the enemy. Tactical movement occurs when enemy contact is imminent, but a direct fire engagement has not yet occurred. Mission orders assign what must be done, but leave the how to the subordinate leader.

3.1 Inform Unit of Plan (Frag Order)

Goal: Provide Mission Order with Commander's Intent to lower levels of command.

Description: The Frag order is a fragment of the Operation Order (OPORD). It informs lower units of their responsibilities within the OPORD. It should ideally leave the specific details to the lower level of command. For example, the Company CO may inform a Platoon CDR to set up ambushes within a general area and where to expect enemy movement. The Platoon CDR then decides where to place the Squads to set up the ambush.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	BN CO	Co CO	Other Co COs	Battalion Net
	Co CO	PLT CDR	Other PLT CDRs	Company Net
	PLT CDR	SQD LDR	Other SQD LDRs	Platoon Net
	SQD LDR	FT LDR	Other FT LDRs	Squad Net
Information	Provide information on the mission objective and the commander's intent, but allowing flexibility on how the mission will be carried out. Ideally this should contain all 5 elements of SMEAC: Situation (enemy and friendly forces), Mission, Execution (Commander's intent, concept of operation, etc), Administrative/Logistics, and Command/Signal.			
Purpose:	Provide an objective to the Marine unit without necessarily forcing a specific solution.			
Potential Problems:	No identified problems			

Notes: The Frag order will become less detailed and formal as it moves down the chain.

3.2 Position Report at Designated Area/Check Point

Goal: The unit moves to either their designated area or their next checkpoint and then reports in.

Description: Unit provides position reports to keep the commanding officer informed on where the unit is and when they will be at their next designated area.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	FT LDR SQD LDR PLT CDR	SQD LDR PLT CDR Co CO	Other FT LDRs Other SQD LDRs Other PLT CDRs	Squad Net Platoon Net Company Net
Information	Identify commanding unit, your unit, and the brevity code for the check point.			
Purpose:	Update your commanding unit of your present position.			
Potential Problems:	Range Limitations			

3.3 Await Enemy Contact

Communication: None

Notes: Issue SALUTE report or engage enemy.

4. Engage Enemy with Direct Fire and Maneuver

4.1 Issue SALUTE Report

Note: Go to task 1.2.2.

4.2 Begin Engaging Enemy

Note: Communication will occur in proceeding tasks or as a SITREP (see task 1.2.1).

4.3 Direct and Lead Unit in Execution of Battle

Notes: Go to task 12.

4.4 Issue SITREP

Note: Go to task 1.2.1.

5. Employ Mortars

Goal: Use of mortars by the maneuver unit to place indirect fire on the enemy or terrain.

Description: Mortars may be employed by the maneuver unit to illuminate, destroy, or suppress the enemy. Mortars may also be employed to mark a target for air with smoke.

Communication: Contained within the subtasks.

Notes: A SALUTE would typically be issued prior to the CFF by the squad leader. The squad leader (Observer) requests fire from the Platoon commander who then evaluates the request.

5.1 Employ 60-mm Mortars (Organic and Attached to the Platoon)

Goal, Description, and Communication are the same as Task 5

5.1.1 Call for Fire (60-mm Mortar)

Goal: Observer calls mortars to fire on the enemy or the terrain.

Description: Within the DO context the 60-mm Mortar will be attached to the platoon. The platoon commander identifies himself provides a warning order, location of target, target description, and method of engagement. If the squad JTAC is the observer the contact information is given to the fire asset.

Communication:

	Bilateral		Monitor:	Network:
	PLT CDR	60-mm Fire Asset	CO FST, SQD LDRs	Platoon Net
Information	Call for Fire has a standard format. PLT CDR initiates CFF 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, smoke, SEAD) ******FDC reads back information******* 3. Location of target (either grid, polar, or shift) ******FDC reads back information******* 4. Target Description 5. Method of Engagement (Type of adjustment, danger close, trajectory, projectile, fuse options) 6. Method of Fire Control ******FDC reads back information*******			
Purpose:	Inform mortar FDC about target so that mortars can be employed.			
Potential Problems:	The Platoon commander may not be co-located with the observer and needs to relay the information up the chain of command. This increases the chances of errors.			

5.1.2 Message to Observer (MTO)

Goal: Inform the observer who will be firing and what the volleys in effect are.

Description: This is the message from the FDC to the observer that details who will fire, any changes to the CFF, the number of volleys in effect, and the target number.

Communication:

	Sender:	Receiver:	Monitor:	Network:
	60-mm Fire Asset	SQD JTAC	PLT CDR, CO FST	Platoon Net
Information	1. Firing Unit 2. Changes/Additions to the CFF 3. Rounds in Effect (Number of Volleys) 4. Target Number			
Purpose:	Notify observer of any changes to the CFF and inform them of what the fire will be.			
Potential Problems:	No identified problems			

Notes: Platoon commander may report on CFF to the rest of the platoon. See task 12.2 for further description.

5.1.3 Report Shot and Splash

Goal: Round is released on target based upon CFF

Description: Mortar fires round and FDC notifies the observer.

Communication:

	Bilateral		Monitor:	Network:
	SQD JTAC	60-mm Fire Asset	PLT CDR, CO FST	Platoon Net
Information	Shot is fired 1. Mortars announce shot (i.e., “Shot over”) 2. Squad acknowledges (i.e., “Shot out”) Five seconds before impact: 3. Mortars announce “Splash over” 4. Squad acknowledges “Splash out”			
Purpose:	Notify squad of shot fired and its predicted impact.			
Potential Problems:	Range limitations.			

Notes: Squad observes impact. May either need to make correction (return to 5.1.4) or fire for effect (return to 5.1.1).

5.1.4 Adjust Fire

Goal: Redirect mortar fire so it is on target.

Communication:

	Sender	Receiver	Monitor:	Network:
	SQD JTAC	60-mm Fire Asset	PLT CDR, Other SQD LDRs, CO FST	Platoon Net
Information	Notify FDC to shift fire Left/Right and Add or Drop 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, smoke, SEAD) ******FDC reads back information******* 3. Location of target (shift)			
Purpose:	Notify FDC to adjust mortar.			
Potential Problems:	Range limitations.			

5.1.5 Inform Fire Asset of Mortar's Effect

Goal: Inform FDC that mortars are no longer necessary.

Communication:

	Sender	Receiver	Monitor:	Network:
	SQD JTAC	60-mm FDC	PLT CDR	Platoon Net
Information	Notify FDC that the target has been destroyed, suppressed, or that mortars are no longer necessary.			
Purpose:	Notify FDC that mortars are no longer necessary			
Potential Problems:	Range limitations.			

5.2 Employ 81-mm Mortar

Goal, Description, and Communication are the same as Task 5.

5.2.1 Call for Fire (81-mm Mortar)

Goal: Observer calls mortars to fire on the enemy or the terrain.

Description: The platoon commander calls direct to the 81-mm Mortar if it is in range (5650 m). The 81-mm is a Battalion level asset. The platoon commander identifies himself and provides a warning order, location of target, target description, and method of engagement. If the squad JTAC is the observer, the contact information is given to the fire asset.

Communication:

	Bilateral	Monitor:	Network:
	PLT CDR 81-mm Fire Asset	Co FST	Battalion Conduct of Fire
Information	Call for Fire has a standard format. SQD LDR initiates CFF 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, smoke, SEAD) ******FDC reads back information******* 3. Location of target (either grid, polar, or shift) ******FDC reads back information******* 4. Target Description 5. Method of Engagement (Type of adjustment, danger close, trajectory, projectile, fuse options) 6. Method of Fire Control ******FDC reads back information*******		
Purpose:	Inform mortar FDC about target so that mortars can be employed.		
Potential Problems:	• Range limitations. •		

5.2.2 Message to Observer (MTO)

Goal: Inform the observer who will be firing and what the volleys in effect are.

Description: This is the message from the FDC to the observer that details who will fire, any changes to the CFF, the number of volleys in effect and the target number.

Communication:

	Sender:	Receiver:	Monitor:	Network:
	81-mm Fire Asset	SQD JTAC	CO FST	Battalion Conduct of Fire
Information	1. Firing Unit 2. Changes/Additions to the CFF 3. Rounds in Effect (Number of Volleys) 4. Target Number			
Purpose:	Notify observer of any changes to the CFF and inform them of what the fire will be.			
Potential Problems:	No identified problems			

5.2.3 Report Shot Fired

Goal: Round is released on target based upon CFF.

Description: Mortar fires round and FDC notifies the observer.

Communication:

	Bilateral		Monitor:	Network:
	SQD JTAC	81-mm Fire Asset	CO FST	Battalion Conduct of Fire
Information	Shot is fired 1. Mortars announce shot (i.e., “Shot over”) 2. Squad acknowledges (i.e., “Shot out”) Five seconds before impact: 3. Mortars announce “Splash over” 4. Squad acknowledges “Splash out”			
Purpose:	Notify squad of shot fired and its predicted impact.			
Potential Problems:	Range limitations.			

Notes: Squad observes impact. May either need to make correction (go to 5.2.5) or fire for effect (return to 5.2.1).

5.2.4 Adjust Fire

Goal: Redirect mortar fire so it is on target.

Communication:

	Sender	Receiver	Monitor:	Network:
	SQD JTAC	81-mm Fire Asset	CO FST	Battalion Conduct of Fire
Information	Notify FDC to shift fire Left/Right and Add or Drop 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, smoke, SEAD) ******FDC reads back information******* 3. Location of target (shift)			
Purpose:	Notify FDC to adjust mortar.			
Potential Problems:	• Range limitations. •			

5.2.5 Inform Fire Asset of Mortar's Effect

Goal: Inform FDC that mortars are no longer necessary.

Communication:

	Sender	Receiver	Monitor:	Network:
	SQD JTAC	81-mm Fire Asset	CO FST	Battalion Conduct of Fire
Information	Notify FDC that the target has been destroyed, suppressed, or that mortars are no longer necessary.			
Purpose:	Notify FDC that mortars are no longer necessary			
Potential Problems:	• Range limitations.			

6. Employ Field Artillery

Goal: Utilize field artillery to engage an enemy target.

Description: Field Artillery is a Battalion level asset. The call for fire is essentially the same as that of Mortars; however, due to the increased range, the call for fire would have to be relayed up the chain of command.

Notes: Communication contained within subtasks.

6.1 Request Fire on Target

Goal: Have the platoon commander relay the call for fire to the fire asset.

Description: Artillery can be up to 18 miles from the target. The Squad Leader may not have the radio capability to contact the fire asset directly. If the Squad Leader is out of range, he will have to contact his Platoon Commander and have him relay the message to the fire asset.

Communication:

	Sender	Receiver	Monitor:	Network:
	SQD LDR	PLT CDR	Other SQD LDRs	Platoon Net
Information	Unit identifier, priority, mission, payload, instructions, target type, location, assets being requested, desired ordnance/results, etc.			
Purpose:	Obtain the Platoon Commander's authorization to use a fire asset to neutralize an enemy target.			
Potential Problems:	• Range limitations. • The Squad Leader will act as the observer but has to relay the message due to radio limitations			

6.2 Call for Fire (Artillery)

Goal: Platoon Commander requests fire from the artillery FDC.

Communication:

	Sender	Receiver	Monitor:	Network:
	PLT CDR	Arty FDC	Co FST Arty Rep	Battalion COF
	Co FST Arty Rep	Arty FDC		Battalion COF
Information	Call for Fire has a standard format. PLT CDR initiates CFF 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, smoke, SEAD) ******FDC reads back information******* 1. Location of target (either grid, polar, or shift) ******FDC reads back information******* 2. Target Description 3. Method of Engagement (Type of adjustment, danger close, trajectory, projectile, fuse options) 4. Method of Fire Control ******FDC reads back information*******			
Purpose:	Inform FDC about target so that artillery can be employed			
Potential Problems:	• Information is being relayed from initial source. Potential for interpretation errors in voice data transmission. • Currently need to talk to the FDC and the observer on two different radios. Cannot have one listen in while relaying information to the other. • The Platoon Commander would have to switch off the company net to go to the battalion FSCC net as both use the PRC-119/150. Inform FDC of where fire is going to increase the splash time.			

6.3 Message to Observer

Goal: Inform the observer who will be firing and what the volleys in effect are.

Description: This is the message from the FDC to the observer that details who will fire, any changes to the CFF, the number of volleys in effect, and the target number.

Communication:

	Sender:	Receiver:	Monitor:	Network:
	Arty FDC	SQD JTAC	CO FST Arty Rep	Battalion Conduct of Fire
	Arty FDC	PLT CDR	CO FST Arty Rep	Battalion Conduct of Fire
	Arty FDC	CO FST Mortar Rep		Battalion Conduct of Fire
Information	1. Firing Unit 2. Changes/Additions to the CFF 3. Rounds in Effect (Number of Volleys) 4. Target Number			
Purpose:	Notify observer of any changes to the CFF and inform them of what the fire will be.			
Potential Problems:	No identified problems			

6.4 Report Shot and Splash

Goal: Round is released on target based upon CFF

Description: Artillery fires round and FDC notifies the Platoon Commander.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	Arty FDC	SQD JTAC	CO FST Arty Rep	Battalion Conduct of Fire
	Arty FDC	PLT CDR	CO FST Arty Rep	Battalion Conduct of Fire
	Arty FDC	CO FST Arty Rep		Battalion Conduct of Fire
Information	Shot is fired 1. Platoon announce shot (i.e., “Shot over”) 2. Squad acknowledges (i.e., “Shot out”) Five seconds before impact: 3. Platoon announces “Splash over” 4. Squad acknowledges “Splash out”			
Purpose:	Notify squad of shot fired and its predicted impact.			
Potential Problems:	No identified problems			

6.5 Adjust Fire (Artillery)

Goal: Redirect mortar fire so it is on target.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	SQD JTAC	Arty FDC	CO FST Arty Rep	Battalion Conduct of Fire
	PLT CDR	Arty FDC	CO FST Arty Rep	Battalion Conduct of Fire
	CO FST Arty Rep	Arty FDC		Battalion Conduct of Fire
Information	Notify FDC to shift fire Left/Right and Add or Drop 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, smoke, SEAD) ******FDC reads back information******* 3. Location of target (shift)			
Purpose:	Notify FDC to adjust mortar.			
Potential Problems:	• Range limitations. • Will be off the Platoon Network; Information may be lost			

6.6 Inform FDC of Artillery's Effect

Goal: Inform FDC of artillery's effect on the target.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	SQD JTAC	Arty FDC	CO FST Arty Rep	Battalion COF
Information	Notify Artillery that the target has been destroyed, suppressed, or where additional fire should be delivered			
Purpose:	Provide Artillery with a BDA			
Potential Problems:	• Range limitations force this step in the communication process.			

7. Close Air Support (CAS)

Goal: Utilize an air asset to engage an enemy target.

Description: This process involves an observer, without assigned air support, identifying an enemy target and then requesting the use of an air asset through the fire support coordination center (FSCC). The FSCC evaluates the request based upon target priority, availability of assets, and locations of friendly forces. If the call for Close Air Support (CAS) is approved, they contact the asset and link the observer with the air asset via frequency and call sign. The observer then controls the asset until the target is eliminated or appropriate munitions are exhausted. Battle Damage Assessment (BDA) is then reported to the aircraft, and the tactical situation, as a result, is sent up the chain.

Communication: Contained within subtasks.

7.1 Request for Air

Goal: Squad Leader/node seeks confirmation from Platoon Commander for the use of an air asset.

Description: Squad Leader identifies an enemy target and determines the need for an air asset to eliminate the target. The Squad Leader then reports the threat and requests air support from the Platoon Commander. Alternatively, the Squad Leader reports a threat to the Platoon Commander who determines the need for air support.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	SQD LDR	PLT CDR	Other SQD LDRs	Platoon Net
Information	Unit identifier, priority, mission, payload, instructions, target type, location, assets being requested, desired ordnance/results, etc.			
Purpose:	Obtain the Platoon Commander's authorization to use an air asset to neutralize an enemy target.			
Potential Problems:	• Inability for Platoon Commander to hear the squad leader due to standard battle noise. • Range limitations.			

7.2 Request Air Asset from Fire Support Coordination Center (FSCC)

Goal: Platoon commander seeks approval from FSCC to use an air asset to neutralize an identified target.

Description: Platoon commander evaluates the request for air and uses his experience to determine whether an air asset should be used. If an asset should be utilized, he "forwards" the information from the squad leader to the FSCC.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	PLT CDR Co FST Air Rep	FSCC or SACC FSCC or SACC	Co FST Air Rep	TAR/HR TAR/HR
Information	Tactical Air Request. Unit identifier, priority, mission, payload, instructions, target type, location, assets being requested, desired ordnance/results, etc.			
Purpose:	Provide FSCC with information necessary to evaluate call for air with available assets and target priority. If necessary, allocate the appropriate asset.			
Potential Problems:	• Information is being relayed from initial source. Potential for interpretation errors in voice data transmission. • Currently need to talk to the FSCC and the Observer/ Squad node on two different radios. Cannot have one listen in while relaying information to the other. • The Platoon Commander would have to switch off the company net to go to the battalion FSCC net as both use the PRC-119/150. • If Aircraft is not available FSCC or currently under the FSCC's control they may need to keep the platoon commander on "hold," thus potentially keeping them off the company net.			

7.3 FSCC Contacts Air Asset

Goal: FSCC sends target information and location to air asset.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	FSCC	Air Asset		
Information	Location of target, requested ordnance, etc., and who in the squad is function as the FAC.			
Purpose:	Notify the air asset of what the target is and who in the squad is function as the FAC.			
Potential Problems:	No identified problems			

7.4 Air Asset and Observer Coordinate Attack (9-Line)

Goal: Neutralize target.

Description: The Squad Leader/node has been told the CFF has been approved and is provided information on contacting the Air Asset. The Squad node communicates with asset to coordinate the attack and provides a standard 9-line.

Communication:

	Bilateral Communication		Monitor:	Network:
Potential Exchanges:	SQD JTAC PLT CDR Co FST Air Rep	Air Asset Air Asset Air Asset	FSCC, Co FST Air Rep FSCC, Co FST Air Rep FSCC	Air Asset's Frequency Air Asset's Frequency Air Asset's Frequency
Information	This is the standard "9-line" brief. It should contain the following: 1. Initial Point/ Battle Position 2. Heading and Offset 3. Distance to target 4. Target Elevation (MSL) 5. Target Description 6. Target Location 7. Mark Type (white phosphorous, illumination, IR pointer, laser, etc) 8. Friendlies 9. Egress It may also include SEAD in effect, ordnance request, hazards, weather, and other relevant information.			
Purpose:	Provide target information to the air asset; neutralize the target.			
Potential Problems:	• Deconfliction with other forces in area is traditionally done at the platoon or Co level. • Limited range of the Squad radio may cause the Platoon Commander to have to contact the aircraft. This may add an extra step. • Squad Leader may have to switch off the squad net to contact the air asset at a different frequency. May lose SA. If Platoon Commander listens in will have the same problem.			

7.5 Air Asset Enters Target Area and Confirms Target

Goal: The observer makes visual contact with the air asset and confirms the target.

Description: The air asset enters into the designated air space and requests confirmation from the observer. The observer visually identifies that the air asset is lined up and confirms the attack.

Communication:

	Bilateral Communication		Monitor:	Network:
Potential Exchanges:	SQD LDR	Air Asset	FSCC, Co FST Air Rep	Air Asset's Frequency
Information	• Aircraft will announce that they are at the assigned Initial Point inbound • Observer delivers nine-line brief • Aircraft goes into "the pop" and observer confirms aircrafts location. • Aircraft goes "wings level" and proceeds to target • Observer confirms aircraft is inbound to target and announces "Cleared Hot"			
Purpose:	Confirm target location and direct aircraft to the target.			
Potential Problems:	No identified problems			

7.6 Observer Reports Battle Damage Assessment (BDA)

Goal: Report effectiveness of attack.

Description: The Squad node communicates with Air Asset to report damage to target.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	SQD JTAC	Air Asset, PLT CDR	PLT CDR, Co FST Air Rep	Air Asset's Frequency
Information	Target neutralized, damage assessment, new coordinates, etc.			
Purpose:	Provide damage information to the Air Asset			
Potential Problems:	• Same radio problem as previous step (leave squad net) • Aircraft may leave the area (range issue)			

Notes: If Re-attack is necessary, return to task 7.4.

8. Employ Naval Gunfire

8.1 Call for Fire (Naval Gunfire)

Goal: The company commander requests fire from Naval Guns.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	PLT CDR	Naval FDC		
Information	Call for Fire has a standard format. PLT CDR initiates CFF 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, SEAD) ******FDC reads back information******* 3. Location of target (either grid, polar, or shift) ******FDC reads back information******* 4. Target Description 5. Method of Engagement (Type of adjustment, danger close, trajectory, projectile, fuse options) 6. Method of Fire Control ******FDC reads back information*******			
Purpose:	Inform FDC about target so that artillery can be employed			
Potential Problems:	• Information is being relayed from initial source. Potential for interpretation errors in voice data transmission. • Inform FDC of where fire is going to increase the splash time.			

8.2 Message to Observer

Goal: Inform the observer who will be firing and what the volleys in effect are.

Description: This is the message from the FDC to the observer that details who will fire, any changes to the CFF, the number of volleys in effect, and the target number.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	Naval FDC Naval FDC	SQD JTAC PLT CDR		
Information	1. Firing Unit 2. Changes/Additions to the CFF 3. Rounds in Effect (Number of Volleys) 4. Target Number			
Purpose:	Notify observer of any changes to the CFF and inform them of what the fire will be.			
Potential Problems:	No identified problems			

Notes: The Company Commander and Platoon Commander should inform their units of incoming fire (task 12.2).

8.3 Splash and Shot (Naval Gunfire)

Goal: Round is released on target based upon CFF.

Description: Naval gun battery fires round and FDC announces shot and splash. The Announcement is passed down the chain to the observer.

Communication:

	Bilateral		Monitor:	Network:
Potential Exchanges:	Naval FDC Co CO PLT CDR	Co CO PLT CDR SQD LDR	Other PLT CDRs Other SQD LDRs	Company Net Platoon Net
Information	Shot is fired 1. FDC announces shot (i.e., “Shot over”) 2. Co CO acknowledges (i.e., “Shot out”) 3. Co CO announces shot (i.e., “Shot over”) 4. PLT LDR acknowledges (i.e., “Shot out”) 5. PLT LDR announces shot (i.e., “Shot over”) 6. SQD LDR acknowledges (i.e., “Shot out”) Fifteen seconds before impact: 7. FDC announces “Splash over” 8. Co CO acknowledges “Splash out” Ten Seconds before impact: 9. Co CO announces “Splash over” 10. PLT CDR acknowledges “Splash out” Five Seconds 11. PLT CDR announces “Splash over” 12. SQD LDR acknowledges “Splash out”			
Purpose:	Notify Platoon of shot fired and its predicted impact			
Potential Problems:	No identified problems			

8.4 Adjust Fire (Naval Gunfire)

Goal: Redirect Naval gunfire so that it is on target.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	SQD LDR PLT CDR Co CO	PLT CDR Co CO Naval FDC	Other SQD LDRs Other PLT CDRs	Platoon Net Company Net
Information	Notify FDC to shift fire Left/Right and Add or Drop 1. Identification (FDC this is_____) 2. Warning Order (either adjust fire, fire for effect, immediate suppression, smoke, SEAD) ******FDC reads back information******* 3. Location of target (shift)			
Purpose:	Notify FDC to adjust fire.			
Potential Problems:	Range limitations.			

8.5 Report on Rounds Effect (Naval Gunfire)

Goal: Provide information up the chain of command regarding effectiveness of naval gunfire.

Communication:

	Sender	Receiver	Monitor:	Network:
Potential Exchanges:	SQD JTAC	Naval FDC		
	PLT CDR	Naval FDC		
Information	Notify up the chain of command that the target has been destroyed, suppressed, or where additional fire should be delivered.			
Purpose:	Inform the commanders on effectiveness of delivered rounds.			
Potential Problems:	• Range limitations force this step in the communication process. • This slows down the speed of the CFF.			

9. Coordinate, Synchronize, and Integrate Fire Support

Description: The task of coordinating and synchronizing fire support is done by the observer making the requests for fire and air. However, coordination and synchronization within the distributed operation concept may be more difficult as calls for fire may have to be routed up the chain of command due to range limitations of radio. This may provide a weaker system for controlling the fire. Additionally, it will push the task of coordinating the fire lower.

Communications: All communications are contained within the Call for Fire, and Call for Air requests.

10. Plan for Combat Operations

10.1 Issue a Warning Order

Goal: A Warning Order is issued to allow a unit to prepare for an upcoming order.

Description: A warning order is issued to provide a unit to time to prepare for an upcoming order. It should contain as much information as is available at the time and follow the five-paragraph SMEAC format as closely as possible.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	CO Co PLT CDR SQD LDR	PLT CDR SQD LDR FT LDR	Other PLT CDRs Other SQD LDRs Other FT LDRs	Company Net Platoon Net Squad Net
Information	There is no official format for warning orders. It may include elements of a SMEAC or may simply instruct a unit to prepare to move out.			
Purpose:	Provide a "heads up" to lower levels of command that an order will be coming down the chain.			
Potential Problems:	Range limitations.			

11. Direct and Lead Units During Preparation for Battle

11.1 Battalion Issues OPORD

Goal: Company Commander Receives the Operation Order from the Battalion

Description: The Operations Order (OPORD) it usually follows the five-paragraph SMEAC format. It sets forth the **Situation**, the **Mission**, the plan and method of **Execution**, **Administration** and Logistics, and **Command** and Signal information.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	Battalion CDR	Co CO	Other Co COs	
Information	Provide information on the mission objective and the commander's intent, but allowing flexibility on how the mission will be carried out. Ideally this should contain all 5 elements of SMEAC. Situation (enemy and friendly forces), Mission, Execution (Commander's intent, concept of operation, etc), Administrative/Logistics, Command/Signal. The OPORD is a more formal document and may be distributed in a digital format.			
Purpose:	Provide an overall objective to the Marine unit without necessarily forcing a specific solution.			
Potential Problems:	No identified problems			

11.2 Issue Warning Order

Notes: See task 10.1 for more information.

11.3 Issue Frag Order

Notes: See task 3.1 for more information.

12. Direct and Lead Units in Execution of Battle

12.1 Issue Frag Order

Notes: See task 3.1 for more information.

13. Handle Combat Support Issues (Logistics)

13.1 Request Combat Supplies

13.1 .1 Request Combat Supplies (e.g., ammo, food, medical)

Goal: Inform the next level of command that supplies are needed to sustain combat effectiveness

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	SQD LDR	PLT CDR	Other SQD LDRs	Platoon Net
Information	Identify unit and the supply need			
Purpose:	Notify the next level of command of supply issues which impact the unit's combat effectiveness.			
Potential Problems:	No identified problems			

13.1.2 Request Supplies from Combat Service Support (CSS) Unit

Goal: Acquire supplies from the Battalion's CSS

Communication:

	Bilateral		Monitor:	Network:
Potential Exchanges:	PLT CDR	CSS		Battalion Supply Net
	Co CO	CSS		Battalion Supply Net
Information	Unit Identification, location, types of supplies needed, urgency of request.			
Purpose:	Acquire supplies from the Battalion's Combat Supporting Supply			
Potential Problems:	No identified problems			

13.2 Handle Casualties

13.2.1 Casualty Report (CASREP)

Goal: Inform commanding unit on wounded.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	SQD LDR	PLT CDR	Other SQD LDRs	Platoon Net
	PLT CDR	Co CO	Other PLT CDRs	Company Net
Information	Number of casualties, types of injuries, urgency of request.			
Purpose:	Inform command unit on injuries. Determine the appropriate course of action for handling wounded.			
Potential Problems:	No identified problems			

13.2.2 Request Casualty Evacuation (CASEVAC) from Battalion

Goal: Have a serious casualty moved from the battlefield for immediate care.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	SQD LDR	Battalion	PLT CDR, Co CO	TAR/HR
	PLT CDR	Battalion	Co CO	TAR/HR
	Co CO	Battalion		TAR/HR
Information	Number of casualties, types of injuries, urgency of request.			
Purpose:	Inform command unit on injuries. Request immediate extraction of critically wounded marines.			
Potential Problems:	Range limitations.			
Questions	What radio would be used?			

13.2.3 Battalion Responds to CASEVAC Request and Provides Contact Information

Goals: Provide information to CASEVAC requester on how CASEVAC will occur.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	Battalion	SQD LDR	PLT CDR, Co CO	TAR/HR
	Battalion	PLT CDR	Co CO	TAR/HR
	Battalion	Co CO		TAR/HR
Information	Type of CASEVAC asset that is inbound, how to contact asset, when asset will arrive.			
Purpose:	Provide information to CASEVAC requestor on how CASEVAC will occur.			
Potential Problems:	No identified problems			

Notes: Timeline requires direct communication

13.2.4 Transportation Asset Responds to CASEVAC

Goal: Inform squad leader of inbound CASEVAC unit and coordinate pick up.

Communication:

	Sender:	Receiver:	Monitor:	Network:
Potential Exchanges:	CASEVAC Asset	SQD LDR	PLT CDR	Plt Tac
	CASEVAC Asset	PLT CDR	Co CO	Plt Tac
	CASEVAC Asset	Co CO		Co Tac
Information	CASEVAC ID, when unit will arrive at CASEVAC pickup site.			
Purpose:	Coordinate pickup of wounded Marines.			
Potential Problems:	Range limitations			

LIST OF MODES PER EXCHANGE TYPE

This section begins with a table reviewing the perceptual modalities with potential relevance to DO communications. This summary is lists the advantages and disadvantages of each communications modality at a highly generalized level. The remainder of the section steps through each unit echelon and each task that the unit at that level would be responsible for and describes the perceptual communications modality that best matches to the needs of that task (based on the advantages and disadvantages described in the summary table). These characterizations are then used as the basis for making the final system recommendations that are presented in the fourth section.

Summary of Human Factors Issues for Different Communication Modalities:

	Advantages	Disadvantages
Auditory	• "Party-line" effect with radios. Individuals can monitor communication between others and gain a better situational awareness (SA). E.g., A squad leader can monitor communications between the platoon commander and another squad leader. • Auditory Communication has an "attention grabbing feature" compared to visual information • Auditory information is more "transient" and has to be dealt with immediately. • Best suited for verbal categorical information • Voice communication also contains information on the sender's emotional state. For example, an individual's level of stress can be reflected in their speech. • New technologies, such as voice over internet protocol (VOIP) systems, can allow messages to be recorded and recalled later; eliminating some of the problems voice communication has with working memory.	• Lack of "permanence." Auditory communication has to be committed to working memory. This can tie up cognitive resources as the individual "rehearses" the information. • Can disrupt an ongoing task. Auditory information can "preempt" visual information to the detriment of the visual attention. However, it is still generally better than interrupting an ongoing visual task with additional visual information. • Comprehension can be low in situations with a low speech-to-noise ratio, such as the battlefield. The problem is greater with radio communications because there are fewer nonverbal cues present. • Individuals may write down auditory information (to minimize demands on working memory) thus increasing their task demands and adding a visual component to the task.
Visual	• Information can be dealt with when the user determines it is appropriate. • Information can be stored permanently so the user does not need to commit it to working memory. • Digital/textual information supports the ability to be directly transferred into other systems, e.g., a Marine can request resupply and have their requirements and location directly transferred to a Battalion computer system. • Best suited for spatial analog information, e.g., navigation.	• User may fail to monitor the incoming information or miss a message within its applicable time frame. • Text based communication can take about twice as long as voice communication. • Textual information does not convey cues about the sender's emotional state as voice communication does. • A textual response would require both of a Marine's hands, making him more vulnerable in a combat situation.

Summary of Human Factors Issues for Different Communication Modalities (continued):

Dual-Modality	• Has been suggested as "the best of both worlds." Capitalizes on the attention-grabbing feature of the auditory modality and the permanence/lack of working memory demands of the visual modality.	• Experimental data on dual modality displays/communication is mixed. • Research suggests an "averaging" effect where performance is between that of only visual or auditory. • Additional training may be required to train individuals when to focus on information from one modality over another.
Haptic	• Research evidence has found that haptic alarms can perform equally well as auditory alarms in tasks where the body has limited movement.	• Research into haptic communication is still limited, particularly with respect to sensitivity of different regions of the body, frequency, and intensity of stimuli. • There is a loss of sensitivity to haptic stimuli with body movement. A moving Marine has an increased chance of missing a haptic alarm while moving.

Fire Team – Squad Exchanges

- Fire Team to Squad Leader
  - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
    - **Best:** Voice communications are best suited for quickly notifying the elements within the command unit of the current situation.
    - **Adequate:** Textual information is adequate for situation reports. The problems with textual information are that the recipient may miss a message and that the process can take twice as long as verbal communication.
  - 1.5 Urgent unformatted reports
    - **Best**: Voice communications are best for urgent time critical reports. Voice communication is faster than text, has an alerting quality, and must be dealt with immediately. The current net system also allows others within the unit to monitor urgent information and maintain their situation awareness.
    - **Adequate:** Textual communications with auditory notification. An auditory notification can help alert the receiver of the incoming message but is not as effective as the voice communication. The time to type and read a message is greater than voice communication.
    - **Poor:** Textual communication is a poor choice for urgent reports. It does not have the same alerting feature as an auditory notification or voice message. It requires more time than voice communication, and does not need to be addressed immediately by the recipient. An urgent text message can be easily missed within its useful time period.
  - 1.6 Routine unformatted reports
    - **Best:** Voice communications are best suited for quickly notifying the different elements within the command unit of the current situation.
    - **Adequate:** Textual information is adequate for situation reports. The problem with textual information is that the recipient may miss a message and the process can take twice as long as verbal communication.

  - 3.2 Position Report at Designated Area/Check Point
    - **Best:** Visual/graphical communication is best for a position report. Graphical communication is best suited for spatial information such as a position report. Ideally an automated PLI system can be used to monitor and track friendly units. It would place minimal burden on the recipient's working memory and can be stored on the system. Additionally the system could allow for the information to be time stamped, so the commanding officer can keep track of where his units have been and when.
    - **Adequate:** Voice communication can be adequately used to report position. The information being conveyed is limited and would not tax the working memory of the recipient. However since it has an alerting quality it can potentially disrupt the recipient's performance on a more important task.
    - **Adequate:** Visual/Text information can be adequately used to transmit position data. Although it is not as fast as voice communication, it is less disruptive to the recipient and can be permanently stored for later access.
- Squad Leader to Fire Team
  - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
    - Same as Fire Team to Squad Leader 1.2.1
  - 1.5 Urgent unformatted reports
    - Same as Fire Team to Squad Leader 1.5
  - 1.6 Routine unformatted reports
    - Same as Fire Team to Squad Leader 1.5
  - 2.2 Distribute Intelligence
    - **Best:** At the fire team level, voice communication is best since the messages will likely be short and the fire team leader has limited time to look at a visual display.
    - **Adequate:** Visual/text and graphics. The fire team leader likely has limited amounts of time to spend looking down at a visual display; however the permanent nature of a visual display would allow him to view the information when the situation permitted.
  - 3.1 Issue Frag Order
    - **Best:** Voice communication is best towards the bottom of the chain where orders are less formal and potentially more time critical.
    - **Adequate:** A text and graphical format is better towards the top of the chain of command where a Frag Order is more detailed and formal. This minimizes working memory demands and can help with comprehension of more complex information.
  - 10.1 Issue Warning Order
    - **Adequate:** Visual/textual communication is ideal for issuing warning orders. The use of graphical data such as maps and text is more appropriate for conveying spatial information.
    - **Adequate:** Auditory information is adequately suited for a warning order. It allows the unit commander to quickly prepare the unit for an incoming order.

Squad – Platoon Exchanges

- Squad Leader to Platoon Commander
  - 1.2.1 Provide a Situation Report (SITREP)
    - Same as 1.2.1 Fire Team to Squad Leader
  - 1.2.2 Report Enemy Activity (SALUTE)
    - **Best:** An automated visual/textual system with an aural alarm would be best to provide a SALUTE report. Since the SALUTE follows a specific format, entry in the system would ideally be selecting the appropriate data for each field and

automatically attaching PLI. The graphical component is best suited for providing spatial information on the target or allowing supplemental information such as pictures.
    - **Adequate:** Voice only communication can adequately convey timely information on a threat, however spatial information regarding the enemy would be more difficult to express than a graphical system.
    - **Poor:** A textual system would require more time than voice communication and has the potential to be missed by the recipient.
- 1.5 Urgent unformatted reports
    - Same as 1.5 Fire Team to Squad Leader
- 1.6 Routine unformatted reports
    - Same as 1.5 Fire Team to Squad Leader
- 2.4 Request For Information (RFI)
    - **Best:** Voice communication is best for a request for urgent information. The message is simple and can be transmitted quickly. Additionally, other units can listen in on the request and potentially provide information.
    - **Adequate:** Textual communication is adequate for requesting information, but most appropriate for non-urgent requests. Depending on the length of the request, the additional time required for a text communication would likely be negligible.
- 3.2 Position Report at Designated Area/Check Point
    - Same as 3.2 Fire Team to Squad Leader
- 6.1 Request Fires on a Target
    - **Best:** Textual and graphical communications are well suited for a fire request. Since a fire request follows a common format, a visual system can be created where the user inputs the situation specific fields, such as target type, and desired ordnance. A graphical component could also aid in confirming the target location with respect to the unit's location. This format could also be used to allow the platoon commander to forward the request to the fire asset, thus reducing the chances of errors.
    - **Adequate:** Voice communication is adequate for a fire request. Although it is the current standard and can convey the urgency of the request better than a visual system, the requirements for read back and forwarding the message can place heavy burdens on working memory and have an increased potential for errors as the request is relayed up to the asset.
- 7.6 Squad JTAC Reports Battle Damage Assessment (BDA).
    - **Best:** An automated textual/graphical system is best for a BDA. The fixed format of the BDA can allow for a simple selection of the damage inflicted and transmittal of the message.
    - **Adequate:** Voice communications are adequately suited for a BDA. The information is simple, and voice allows for the information to be quickly disseminated through the unit.
- 13.1.1 Request Resupply (e.g., Ammo, food, medical)

  Situation Dependent

  Urgent:
    - **Best:** Voice communications are best suited for a supply request within the platoon. The information can be quickly conveyed to the platoon leader and the other squad leader can listen to the request and survey their supply status.
    - **Adequate:** Textual communication can adequately be used for a supply request however it would ideally be distributed to all of the squad leaders and the platoon commander.

  Non-Urgent:
    - **Best:** A textual system would be best for non-urgent supply requests. This

allows the Supply Officer to attend to the request at an appropriate time and amass the requests and supply levels of all the units in order to deal with the request properly.

- 13.2.1 Casualty Report (CASREP)
  - **Best:** Voice communications are best suited for quickly notifying the command unit of the current casualty situation.
  - **Poor:** Textual information is poorly suited for an urgent CASREP. The additional time required can be critical in addressing the casualty situation. However, for minor wounds a textual system would be more appropriate.

- Platoon Commander to Squad Leader
  - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
    Same as Squad Leader to Fire Team Leader 1.2.1
  - 1.5 Urgent unformatted reports
    Same as Squad Leader to Fire Team Leader 1.5
  - 1.6 Routine unformatted reports
    Same as Squad Leader to Fire Team Leader 1.6
  - 2.2 Distribute Intelligence
    - **Situation Dependent**
      Less Time Critical:
      - **Best:** Visual/Text and graphics. At the squad level and above visual communication system is best for complex information and/or less time critical information. Visual information can be stored permanently and does not burden the recipient's working memory to the extent verbal communication does. Additionally, graphical information is a better modality of communication for spatial information such as maps.
      - **Adequate:** Auditory communication can heavily tax the working memory system and is not ideally suited for spatial information.

      Time Critical:
      - **Best:** Voice communication is best for time critical information because it will get the immediate attention of the Platoon Commander.
  - 3.1 Issue Frag Order
    - **Best:** A text and graphical format is better towards the top of the chain of command where a Frag Order is more detailed and formal. This minimizes working memory demands and can help with comprehension of more complex information
    - **Adequate:** Voice communication is best towards the bottom of the chain where orders are less formal and potentially more time critical.
  - 10.1 Issue Warning Order
    Same as Squad Leader to Fire Team Leader 10.1

- Platoon Commander to 60-mm Mortar
  - 5.1.1 Call for Fire (60-mm Mortar)
    - **Best:** A mixed auditory/visual format for a CFF could provide the advantages of both voice and visual formats. The initial CFF, identification and warning order, could be made via voice to convey the urgency of the request, while the remainder of the transmission is made via text and graphics. The text based system would eliminate read back, reduce the likelihood of errors, and could interface with PLI to provide automated position data.
    - **Adequate:** A visual/text based system could convey the information without the need for read backs, however it would not convey the same urgency as a voice request.

        - **Adequate:** An auditory message has a higher potential for errors in transmission and requires read back but would properly convey the urgency of the request.
- 60-mm Mortar to Squad JTAC
    - 5.1.2 Message to Observer (MTO)
        - **Best:** A voice communication to the observer is the ideal method of transmitting the MTO, especially if the observer did not make the CFF to the Asset. This will help ensure the observer receives the message and the current radio system allows other members of the unit to remain informed on the CFF.
        - **Adequate:** A textual communication could serve as the MTO. However it has the potential to not be received in a timely manner.
    - 5.1.3 Report Shot and Splash
        - **Best:** Voice is the ideal format for announcing the splash and shot. It can convey the message's urgency and allows for a rapid exchange.
        - **Adequate:** An automated text system could serve to rapidly exchange shot and splash confirmation; however it would require an auditory component to convey urgency.
- Squad JTAC to 60-mm Mortar
    - 5.1.3 Report Shot and Splash
      Same as 60-mm Mortar to Squad JTAC 5.1.3
    - 5.1.4 Adjust Fire
        - **Best:** Voice communication would allow for rapid transmission of the fire adjustment.
        - **Adequate:** A text message could adequately provide the fire adjustment information but would not be as rapid as a voice communication.
    - 5.1.5 Inform Firing Asset of Effect
        - **Best:** Voice communication would allow for rapid transmission of the BDA, and the current net system would allow for others to remain in the loop on the CFF.
        - **Adequate:** A text message could adequately provide the BDA but would not be as rapid as a voice communication, and would ideally be communicated to other individuals within the unit.

Squad – Battalion Exchanges

- Squad JTAC to 81-mm Mortar Firing Asset
    - 5.2.3 Report Shot Fired
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
    - 5.2.4 Adjust Fire
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.4
    - 5.2.5 Inform Fire Asset of Mortar's effect
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5
- 81-mm Mortar Firing Asset to Squad JTAC
    - 5.2.2 Message to Observer
        - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
    - 5.2.3 Report Shot Fired
        - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
- Squad JTAC to Artillery Battery
    - 6.4 Report Shot and Splash
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
    - 6.5 Adjust Fire
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.4
    - 6.6 Inform FDC of Artillery's Effect
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5
- Artillery Battery to Squad JTAC
    - 6.3 Message to Observer

        - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
    - 6.4 Report Shot and Splash
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
- Squad JTAC to Ship (NSFS)
    - 8.3 Report Shot and Splash
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
    - 8.4 Adjust Fire
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.4
    - 8.5 Report on Rounds Effect
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5
- Ship (NSFS) to Squad JTAC
    - 8.2 Message to Observer
        - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
    - 8.3 Report Shot and Splash
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
- Squad JTAC to Air Asset
    - 7.4 Air Asset and Squad JTAC coordinate attack (9 Line)
        - **Best:** A mixed auditory/visual format for the 9 line could provide the advantages of both voice and visual formats. As with the CFF the initial identification and warning order could be made via voice to convey the urgency of the request, while the remainder of the transmission is made via text and graphics. The text based system would eliminate read back, reduce the likelihood of errors, and could interface with PLI to provide automated position data.
        - **Adequate:** A visual/text based system could convey the information without the need for read backs and would simplify forwarding the message; however it would not convey the same urgency as a voice request.
        - **Adequate:** An auditory message has a higher potential for errors in transmission and requires read back but would properly convey the urgency of the request.
    - 7.5 Air Asset Enters Target Area and Confirms Target
        - **Best:** Voice communication would allow for rapid transmission of the target confirmation.
        - **Adequate:** A text message could adequately provide the target confirmation but would not be as rapid as a voice communication, or convey the same urgency.
    - 7.6 Squad JTAC Reports Battle Damage Assessment (BDA)
        - **Best:** Voice communication would allow for rapid transmission of the BDA, and the current net system would allow for others to remain in the loop on the attack.
        - **Adequate:** A text message could adequately provide the BDA but would not be as rapid as a voice communication, and would ideally be communicated to other individuals within the unit.
- Air Asset to Squad JTAC
    - 7.4 Air Asset and Squad Leader coordinate attack (9 Line)
        - Same as Squad JTAC to Air Asset 7.4
    - 7.5 Air Asset Enters Target Area and Confirms Target
        - Same as Squad JTAC to Air Asset 7.5
    - 7.6 Squad JTAC Reports Battle Damage Assessment (BDA)
        - Same as Squad JTAC to Air Asset 7.6
- Squad Leader to Battalion
    - 13.2.2 Request Casualty Evacuation (CASEVAC) from Battalion
        - **Best:** A mixed auditory/visual communication would be ideal for a CASEVAC request. The voice component would convey the urgency where automated PLI can expedite the process of providing current unit location. Graphical information can also be used to more clearly indicate the rendezvous point.
        - **Adequate:** A voice alone communication would convey the urgency of the

request but would require additional time if not tied to the PLI data.
        - **Poor:** A textual communication would not convey the urgency required for a CASEVAC, and a miss or delay in reading/receiving a message could result in loss.
- Battalion to Squad
    - 13.2.3 Battalion Responds to CASEVAC Request and Provides Contact Information
        - **Best:** A mixed auditory/visual communication would be ideal. The message could be transmitted through voice with critical information such as the assets frequency and inbound time could be provided textually to reduce the working memory burden.
        - **Adequate:** A voice only communication would place an additional burden on working memory.
        - **Adequate:** A text based system would require additional time and would not immediately alert the recipient the message has arrived as well as an auditory/voice system.
- Transportation Asset to Squad
    - 13.2.4 Transportation Asset Responds to CASEVAC
        - **Best:** A voice communication can rapidly convey the information necessary to coordinate and complete the CASEVAC
        - **Adequate:** A text communication can be used to coordinate the CASEVAC; however it would not be as rapid as a voice communication.

Platoon – Company Exchanges

- Platoon Commander to Company Commander
    - 1.2.1 Provide a Situation Report (SITREP)
        - Same as Fire Team to Squad Leader 1.2.1
    - 1.2.2 Report Enemy Activity (SALUTE)
        - Same as Squad Leader to Platoon 1.2.2
    - 1.5 Urgent unformatted reports
        - Same as Fire Team to Squad Leader 1.5
    - 1.6 Routine unformatted reports
        - Same as Fire Team to Squad Leader 1.6
    - 2.4 Request for Information
        - Same as Squad Leader to Platoon Commander 2.4
    - 3.2 Position Report at Designated Area/Check Point
        - Same as Squad Leader to Platoon Commander 3.2
    - 13.2.1 Casualty Report (CASREP)
        - Squad Leader to Platoon Commander 13.2.1
- Company Commander to Platoon Commander
    - 1.2.1 Provide a Situation Report (SITREP) (unformatted)
        - Same as Squad Leader to Fire Team 1.2.1
    - 1.5 Urgent unformatted reports
        - Same as Squad Leader to Fire Team 1.5
    - 1.6 Routine unformatted reports
        - Same as Squad Leader to Fire Team 1.6
    - 2.2 Distribute Requested Intelligence
        - Same as Platoon Commander to Squad Leader 2.2
    - 3.1 Issue Frag Order
        - Same as Platoon Commander to Squad Leader 3.1
    - 10.1 Issue Warning Order
        - Same as Platoon Commander to Squad Leader 10.1
- Platoon Commander to 60-mm Mortar Firing Asset
    - 5.2.1 Call for Fire (60-mm Mortar)
        - **Best:** A mixed auditory/visual format for a CFF could provide the advantages of

both voice and visual formats. The initial CFF, identification and warning order could be made via voice to convey the urgency of the request, while the remainder of the transmission is made via text and graphics. The text based system would eliminate read back, reduce the likelihood of errors, and could interface with PLI to provide automated position data.
        - **Adequate:** A visual/text based system could convey the information without the need for read backs, however it would not convey the same urgency as a voice request.
        - **Adequate:** An auditory message has a higher potential for errors in transmission and requires read back but would properly convey the urgency of the request.

Platoon – Battalion Exchanges

- Platoon Commander to 81-mm Mortar Firing Asset
    - 6.2 Call for Fire
        - Same as Platoon Commander to 60-mm Mortar Firing Asset 5.2.1
    - 6.5 Adjust Fire
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.4
    - 6.6 Inform FDC of Artillery's Effect
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5
- 81-mm Mortar Firing Asset to Platoon Commander
    - 6.3 Message to Observer
        - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
    - 6.4 Report Splash and Shot
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
- Platoon Commander to Artillery Battery
    - 6.2 Call for Fire (Artillery)
        - **Best:** A mixed auditory/visual format for a CFF could provide the advantages of both voice and visual formats. The initial CFF, identification and warning order could be made via voice to convey the urgency of the request, while the remainder of the transmission is made via text and graphics. The text based system would eliminate read back, reduce the likelihood of errors, and could interface with PLI to provide automated position data.
        - **Adequate:** A visual/text based system could convey the information without the need for read backs, however it would not convey the same urgency as a voice request.
        - **Adequate:** A voice message has a higher potential for errors and requires read back but would properly convey the urgency of the request.
    - 6.5 Adjust Fire
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.4
    - 6.6 Inform FDC of Artillery's Effect
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5
- Artillery Battery to Platoon Commander
    - 6.3 Message to Observer
        - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
    - 6.4 Report Splash and Shot
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
- Platoon Commander to Ship (NSFS)
    - 8.1 Call for Fire (Naval Gunfire)
        - Same as Platoon Commander to 60-mm Mortar Firing Asset 5.2.1
    - 8.3 Splash and Shot (Naval Gunfire)
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
    - 8.5 Report on Rounds Effect
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5

- Ship (NSFS) to Platoon Commander
  - 8.2 Message to Observer
    - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
  - 8.3 Splash and Shot (Naval Gunfire)
    - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
- Platoon Commander to BN FSCC
  - 7.2 Request Air Asset from Fire Support Coordination Center
    - **Best:** A mixed auditory/visual format for a call for air could provide the advantages of both voice and visual formats. The initial, identification and warning order could be made via voice to convey the urgency of the request, while the remainder of the transmission is made via text and graphics. The text based system would eliminate read back, reduce the likelihood of errors, and could interface with PLI to provide automated position data.
    - **Adequate:** A visual/text based system could convey the information without the need for read backs, however it would not convey the same urgency as a voice request.
    - **Adequate:** An auditory message has a higher potential for errors in transmission and requires read back but would properly convey the urgency of the request.
- Platoon Commander and Air Asset (Bilateral Comm).
  - 7.4 Air Asset and Squad Leader coordinate attack (9 Line)
    - Same as Squad JTAC to Air Asset 7.4
  - 7.5 Air Asset Enters Target Area and Confirms Target
    - Same as Squad JTAC to Air Asset 7.5
  - 7.6 Squad leader reports battle damage assessment (BDA) of target back to Air Asset.
    - Same as Squad JTAC to Air Asset 7.6
- Platoon Commander to Battalion
  - 13.2.2 Request Casualty Evacuation (CASEVAC) from Battalion
    - Same as Squad Leader to Battalion 13.3.2
- Battalion to Platoon Commander
  - 13.2.3 Battalion Responds to CASEVAC Request and Provides Contact Information
    - Same as Battalion to Squad Leader 13.2.3
- Transportation Asset to Platoon Commander
  - 13.2.4 Transportation Asset Responds to CASEVAC
    - Same as Transportation Asset to Squad Leader 13.2.4
- ** Platoon Commander to BN S-2
  - 2.5 Request Intelligence from BN S-2
    - **Best:** When the request is not critical a text communication would work best. It would allow for a record of the request and can be handled when the S-2 is available.
    - **Adequate:** A voice communication is adequate for an intelligence request. However, it requires immediate attention from the S-2 and may tax their working memory if they can not handle the request immediately.
- ** BN S-2 to Platoon Commander
  - 2.6 Battalion S-2 Provides Platoon Commander Intelligence
    - **Best:** Visual/Text and graphics. A visual communication system is best for complex information and/or less time critical information. Visual information can be stored “permanently” and does not burden the recipients working memory to the extent verbal communication does. Additionally graphical information is a better modality of communication for spatial information such as maps.
    - **Adequate:** Auditory communication can heavily tax the working memory system and is not ideal for more complex messages.
- Platoon Commander to CSS

- 13.1.2 Request Supplies from Combat Service Support (CSS)
  - **Best:** The best format for a non-urgent supply request would be a textual/graphical format. This would minimize demands on working memory at the CSS and could potential be an automated system that helps the CSS prioritize the request. Since the address would not need to be addressed immediately having a permanent record of the request is highly beneficial.
  - **Adequate:** A voice format would place additional demands on the CSS as they would either need to write down the request information or commit it to memory.

Company – Battalion Exchanges:

- Company to Battalion
  - 1.2.1 Provide a Situation Report (SITREP)
    - Same as Fire Team to Squad Leader 1.2.1
  - 1.2.2 Report Enemy Activity (SALUTE)
    - Same as Squad Leader to Platoon 1.2.2
  - 1.5 Urgent unformatted reports
    - Same as Fire Team to Squad Leader 1.5
  - 1.6 Routine unformatted reports
    - Same as Fire Team to Squad Leader 1.6
  - 2.4 Request for Information
    - Same as Squad Leader to Platoon Commander 2.4
  - 3.2 Position Report at Designated Area/Check Point
    - Same as Squad Leader to Platoon Commander 3.2
  - 13.2.1 Casualty Report (CASREP)
    - Same as Squad Leader to Platoon Commander 13.2.1
  - 13.3.2 Request Casualty Evacuation (CASEVAC) from Battalion
    - Same as Squad Leader to Battalion 13.3.2
- Battalion to Company
  - 1.2.1 Provide a Situation Report (SITREP)
    - Same as Squad Leader to Fire Team 1.2.1
  - 1.5 Urgent unformatted reports
    - Same as Squad Leader to Fire Team 1.5
  - 1.6 Routine unformatted reports
    - Same as Squad Leader to Fire Team 1.6
  - 2.2 Distribute Requested Intelligence
    - Same as Platoon Commander to Squad Leader 2.2
  - 3.1 Issue Frag Order
    - Same as Platoon Commander to Squad Leader 3.1
  - 10.1 Issue Warning Order
    - Same as Platoon Commander to Squad Leader 10.1
- Company FST Arty Rep Artillery FDC
  - 6.2 Call for Fire
    - Same as Platoon Commander to 60-mm Mortar Firing Asset 5.2.1
  - 6.5 Adjust Fire
    - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.4
  - 6.6 Inform FDC of Artillery's Effect
    - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5
- Artillery FDC to Company FST Arty Rep
  - 6.3 Message to Observer
    - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
  - 6.4 Report Splash and Shot
    - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
- Company FST NGL to Ship (NSFS)
  - 8.1 Call for Fire (Naval Gunfire)

        - Same as Platoon Commander to 60-mm Mortar Firing Asset 5.2.1
    - 8.3 Splash and Shot (Naval Gunfire)
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
    - 8.5 Report on Rounds Effect
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.5
- Ship (NSFS) to Company FST NGL
    - 8.2 Message to Observer
        - Same as 60-mm Mortar Firing Asset to Squad JTAC 5.1.2
    - 8.3 Splash and Shot (Naval Gunfire)
        - Same as Squad JTAC to 60-mm Mortar Firing Asset 5.1.3
- Company FST Air Rep to BN FSCC
    - 7.2 Request Air Asset from Fire Support Coordination Center
        - Same as Platoon Commander to BN FSCC 7.2
- Company FST Air Rep to Air Asset (Bilateral Comm).
    - 7.4 Air Asset and Observer Coordinate Attack (9 Line)
        - Same as Squad JTAC to Air Asset 7.4
    - 7.5 Air Asset Enters Target Area and Confirms Target
        - Same as Squad JTAC to Air Asset 7.5
    - 7.6 Observer Reports Battle Damage Assessment (BDA)
        - Same as Squad JTAC to Air Asset 7.6
- Transportation Asset to Company
    - 13.3.4 Transportation Asset Responds to CASEVAC
        - Same as Transportation Asset to Squad Leader 13.3.4

**** This exchange would only occur when a single platoon was ashore. Otherwise it would occur at a higher level of command.**

RECOMMENDED SYSTEM/OPTIMAL MIX OF DEVICES PER NODE

This section contains the final list of recommendations for communications data formats and available communications gear that can meet the requirements for communications capabilities at each echelon. In making these recommendations, the primary consideration was the ability of the system to meet the demands of the task (based on the type of information that must be delivered, the likely distance that it must cover, who needed to receive the information, and which network (squad, platoon, etc.) it should be delivered on (as described in the List of Modes per Exchange Type section)). Where more than one system met these capabilities, the deciding consideration taken into account was the weight of the system with a bias towards maintaining the lightest load possible.

Fire Team Node

Identified Direct Exchanges	Recommended Data Formats	Estimated Max Distance	Recommended System
Fire Team Members	Voice communication	100 m	IISR
Squad Leader	Voice communication: • 1.2.1 Provide a Situation Report (SITREP) (unformatted) • 1.5 Urgent unformatted reports • 1.6 Routine unformatted reports Visual/graphical • 3.2 Position Report at Designated Area/Check Point	Less than 1 km	AN/PRC-148 (THHR) with D-DACT
PLI Network	• Visual	*ad hoc network	D-DACT

Squad Leader Node

Identified Direct Exchanges	Recommended Data Formats	Estimated Max Distance	Recommended System
Fire Team Leader	Voice communication: • 1.2.1 Provide a Situation Report (SITREP) (unformatted) • 1.5 Urgent unformatted reports • 1.6 Routine unformatted reports • 2.2 Distribute Intelligence • 3.1 Issue Frag Order Visual/graphical • 10.1 Issue Warning Order	Less than 1km	AN/PRC-148 (THHR) with D-DACT
Platoon Commander	Voice communication: • 1.2.1 Provide a Situation Report (SITREP) (unformatted) • 1.5 Urgent unformatted reports • 1.6 Routine unformatted reports • 2.4 Request For Information (RFI) • 13.1.1 Request Resupply (Urgent) • 13.2.1 Casualty Report (CASREP) Visual/graphical • 1.2.2 Report Enemy Activity (SALUTE) • 3.2 Position Report at Designated Area/Check Point • 6.1 Request Fires on a Target	5 km	AN/PRC-148 (THHR) with D-DACT

	• 7.6 Squad JTAC Reports Battle Damage Assessment (BDA) • 10.1 Issue Warning Order • 13.1.1 Request Resupply (Non-Urgent)		
Battalion	Visual/text + graphical (With Voice) • 13.2.2 Request Casualty Evacuation (CASEVAC) from Battalion	200 km	AN/PRC-117F (SATCOM) or AN/PRC-150 based upon Battalions Location
Transportation Asset	Voice communication • 13.2.4 Transportation Asset Responds to CASEVAC	10 km	AN/PRC-150
PLI Network	• Visual	*ad hoc network	D-DACT

Squad JTAC

Identified Direct Exchanges	**Recommended Data Formats**	**Estimated Max Distance**	**Recommended System**
60-mm Mortar	Voice communication • 5.1.3 Report Shot and Splash • 5.1.4 Adjust Fire • 5.1.5 Inform Firing Asset of Effect	4k (Effective Range)	AN/PRC-148 (THHR)
81-mm Mortar	Voice communication • 5.2.3 Report Shot and Splash • 5.2.4 Adjust Fire • 5.2.5 Inform Firing Asset of Effect	5k (Effective Range)	AN/PRC-148 (THHR)
Artillery Battery	Voice communication • 6.4 Report Shot and Splash • 6.5 Adjust Fire • 6.6 Inform Firing Asset of Effect	35 km (Effective Range)	AN/PRC-150
Ship NSFS	Voice communication • 8.3 Report Shot and Splash • 8.4 Adjust Fire • 8.5 Inform Firing Asset of Effect	200 km (Effective Range)	AN/PRC-117F (SATCOM)
Air Asset	Voice communication • 7.5 Air Asset Enters Target Area and Confirms Target	25 km	AN/PRC-150 with D-DACT

	• 7.6 Squad JTAC Reports Battle Damage Assessment (BDA) Visual/graphical (with audio) • 7.4 Air Asset and Squad JTAC coordinate attack (9- Line)		

Platoon Commander

Identified Direct Exchanges	Recommended Data Formats	Estimated Max Distance	Recommended System
Squad Leader	Voice Communication • 1.2.1 Provide a Situation Report (SITREP) (unformatted) • 1.5 Urgent unformatted reports • 1.6 Routine unformatted reports • 2.2 Distribute Intelligence (Urgent) Visual/graphical • 2.2 Distribute Intelligence (Non-Urgent) • 3.1 Issue Frag Order • 10.1 Issue Warning Order	5 km	AN/PRC-148 (THHR)
Company Commander	Voice communication: • 1.2.1 Provide a Situation Report (SITREP) (unformatted) • 1.5 Urgent unformatted reports • 1.6 Routine unformatted reports • 2.4 Request For Information (RFI) • 13.1.1 Request Resupply (Urgent) • 13.2.1 Casualty Report (CASREP) Visual/graphical • 1.2.2 Report Enemy Activity (SALUTE) • 3.2 Position Report at Designated Area/Check Point • 10.1 Issue Warning Order	7 km	AN/PRC-150 with D-DACT
60-mm Mortar	Voice communication • 5.1.3 Report Shot and Splash • 5.1.4 Adjust Fire • 5.1.5 Inform Firing Asset of Effect Visual/graphical • 5.1.1 Call for Fire (60-mm	4k (Effective Range)	AN/PRC-148 (THHR) with D-DACT

	Mortar)		
81-mm Mortar	Voice communication • 5.2.3 Report Shot and Splash • 5.2.4 Adjust Fire • 5.2.5 Inform Firing Asset of Effect Visual/graphical • 5.2.1 Call for Fire (60-mm Mortar)	5k (Effective Range)	AN/PRC-148 (THHR) with D-DACT
Artillery Battery	Voice communication • 6.4 Report Shot and Splash • 6.5 Adjust Fire • 6.6 Inform Firing Asset of Effect Visual/graphical • 6.2 Call for Fire (Artillery)	35 km (Effective Range)	AN/PRC-150
Ship NSFS	Voice communication • 8.3 Report Shot and Splash • 8.4 Adjust Fire • 8.5 Inform Firing Asset of Effect	200 km (Effective Range)	AN/PRC-117F (SATCOM)
Air Asset	Voice communication • 7.5 Air Asset Enters Target Area and Confirms Target • 7.6 Squad JTAC Reports Battle Damage Assessment (BDA) Visual/graphical (with audio) • 7.4 Air Asset and Squad JTAC coordinate attack (9- Line)	25 km	AN/PRC-150 with D-DACT
Battalion FSCC	Visual/graphical (with audio) • 7.2 Request Air Asset from Fire Support Coordination Center •	100 km	AN/PRC-117F (SATCOM)
BN S-2	Voice communication • 2.5 Request Intelligence from BN S-2 (Urgent) Visual/graphical • 2.5 Request Intelligence from BN S-2 (Not-Urgent)	100 km	AN/PRC-117F (SATCOM)
Combat Service Support	Visual/graphical • 13.1.2 Request Supplies from Combat Service Support (CSS)	100 km	AN/PRC-117F (SATCOM) with D-DACT

Transportation Asset	Voice communication • 13.2.4 Transportation Asset Responds to CASEVAC	10 km	AN/PRC-148 (THHR)
PLI Network	• Visual	*ad hoc network	D-DACT

Company Commander

Identified Direct Exchanges	**Recommended Data Formats**	**Estimated Max Distance**	**Recommended System**
Platoon Commander	Voice Communication • 1.2.1 Provide a Situation Report (SITREP) (unformatted) • 1.5 Urgent unformatted reports • 1.6 Routine unformatted reports • 2.2 Distribute Intelligence (Urgent) Visual/graphical • 2.2 Distribute Intelligence (Non-Urgent) • 3.1 Issue Frag Order • 10.1 Issue Warning Order	10 km	AN/PRC-150 with D-DACT
BN S-2	Voice communication • 2.5 Request Intelligence from BN S-2 (Urgent) Visual/graphical • 2.5 Request Intelligence from BN S-2 (Not-Urgent)	100 km	AN/PRC-117F (SATCOM)
Combat Service Support	Visual/graphical • 13.1.2 Request Supplies from Combat Service Support (CSS)	100 km	AN/PRC-117F (SATCOM)
Transportation Asset	Voice communication • 13.2.4 Transportation Asset Responds to CASEVAC	10 km	AN/PRC-148 (THHR)
PLI Network	• Visual	*ad hoc network	D-DACT

FiST

Identified Direct Exchanges	**Recommended Data Formats**	**Estimated Max Distance**	**Recommended System**
60-mm Mortar	Voice communication • 5.1.3 Report Shot and Splash • 5.1.4 Adjust Fire • 5.1.5 Inform Firing Asset of Effect Visual/graphical • 5.1.1 Call for Fire (60-mm Mortar)	4k (Effective Range)	AN/PRC-148 (THHR) with D-DACT
81-mm Mortar	Voice communication • 5.2.3 Report Shot and Splash • 5.2.4 Adjust Fire • 5.2.5 Inform Firing Asset of Effect Visual/graphical • 5.2.1 Call for Fire (81-mm Mortar)	5k (Effective Range)	AN/PRC-148 (THHR) with D-DACT
Artillery Battery	Voice communication • 6.4 Report Shot and Splash • 6.5 Adjust Fire • 6.6 Inform Firing Asset of Effect Visual/graphical • 6.2 Call for Fire (Artillery)	35 km (Effective Range)	AN/PRC-150
Ship NSFS	Voice communication • 8.3 Report Shot and Splash • 8.4 Adjust Fire • 8.5 Inform Firing Asset of Effect	200 km (Effective Range)	AN/PRC-117F (SATCOM)
Air Asset	Voice communication • 7.5 Air Asset Enters Target Area and Confirms Target • 7.6 Squad JTAC Reports Battle Damage Assessment (BDA) Visual/graphical (with audio) • 7.4 Air Asset and Squad JTAC coordinate attack (9 Line)	25 km	AN/PRC-150 with D-DACT
Battalion FSCC	Visual/graphical (with audio)	100 km	AN/PRC-117F

• 7.2 Request Air Asset from Fire Support Coordination Center	(SATCOM)

REFERENCES

1. Sea Viking Division (October 2004). *Marine Corps Gazette*, pp. 34-36.

2. Maj Demetrius F. Maxey (April 2005). *Marine Corps Gazette*, pp. 43-45.